

1969

**OPERATING
SUMMARY**

PORT COLBORNE

water pollution control plant

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MAR 25 1971

ONTARIO WATER
RESOURCES COMMISSION

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

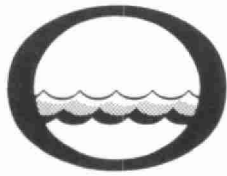
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Water management in Ontario

Ontario
Water Resources
Commission


135 St. Clair Ave. W.
Toronto 195
Ontario

The operating efficiency and financial status of the water pollution control facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.


D.S. Caverly,
General Manager.


D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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PORT COLBORNE
water pollution control plant

operated for

THE CITY OF PORT COLBORNE

by the

ONTARIO WATER RESOURCES COMMISSION

1969 ANNUAL OPERATING SUMMARY

'69 REVIEW

GENERAL

A total flow of 963.6 million gallons was treated at the East Side and West Side Plants in 1969, an increase of 4% over the previous year's flows. The dry weather design flows for the East Side and West Side Plants were exceeded 98% and 83% of the time respectively. Excess raw sewage flows bypassed the treatment facilities at the East Side Plant on a continuous basis during the year, but all flows directed to the West Side Plant received complete treatment.

The total treatment cost was \$97,206.18, representing a cost of \$100.88 per million gallons of sewage treated or 12 cents per pound of BOD removed.

The average BOD and suspended solids concentrations in the raw sewage indicated that there had been little change in the amount of storm water infiltration into the sewage system draining to the West Side plant. However, an increase of approximately 20% in organic strength and suspended solids concentrations in the raw sewage directed to the East Side plant indicated a reduction of infiltration in the area draining to that plant.

Plans and specifications to complete the required renovations at the East Side plant will be completed in March 1970. The renovations will include modifications to the inlet works, return sludge pumping facilities and plant metering equipment, and provision of chlorination facilities. The renovations to the aeration section which included the replacement of the aeration support bridges and repairs to the aerators, line shaft, etc. were completed in June 1969.

The replacement of the deteriorated underground wiring at the West Side Plant was completed in 1969.

The works for the modifications to the Fretz Park Pumping Station, to increase its pumping capacity, were accepted as an OWRC municipal project in the fall. Installation of the third pump with standby power facilities should start in May or June, 1970.

Tenders were called in the fall for the installation of one Flygt and two prefabricated underground pumping stations, together with 5600 feet of forcemain and 29,000 feet of sewers in the Rosemount area. Construction of these works under three separate contracts was to be started in January 1970.

PLANT FLOWS and CHLORINATION

West Side Plant - During 1969, a total flow of 436.6 million gallons was treated representing an increase of approximately 2.6% over last year's flows. The average daily flow of 1.1 million gallons exceeded the design dry weather flow of 0.9 mgd 83% of the time during the year.

East Side Plant - A total flow of 526.9 million gallons was treated, representing an increase of 5% over the last year's treated flows. The average treated daily flow of 1.4 million gallons exceeded the design dry weather flow of 0.85 mgd 98% of the time. Part of the raw sewage flows bypassed the plant's treatment facilities on a continuous basis during the year.

PLANT EFFICIENCY

West Side Plant - The average raw sewage strength was 81 milligrams per litre BOD and 86 milligrams per litre suspended solids. The low concentrations indicate considerable infiltration to the collector system draining to this plant. The average effluent quality of 12 mg/l BOD and 16 mg/l suspended solids was satisfactory.

East Side Plant - The average BOD and suspended solids concentrations in the raw sewage were 114 mg/l and 197 mg/l respectively -- an increase of approximately 20% over last year's raw sewage strengths. The effluent BOD and suspended solids concentrations of 11 mg/l and 19 mg/l respectively pertain only to the treated portion of the raw sewage flows. The combined treated and untreated effluent strengths are considerably higher.

AERATION

West Side Plant - The average loading on the aeration section was 0.34 pounds of BOD per pound of MLSS, an increase in loading of approximately 50% over 1968. The average MLSS concentration was 1,515 mg/l.

East Side Plant - The average loading on the aeration section was 0.33 pounds per pound of MLSS which was similar to the 1968 figure. The average MLSS concentration was 2490 mg/l.

SLUDGE DIGESTION and DISPOSAL

West Side Plant - A total of 909,900 gallons of raw sewage was pumped to the digesters in 1969. Of this total, 382,700 gallons or approximately 42% were returned to the treatment process as supernatant. A total of 2,709 cu. yds. of digested sludge was removed by the sludge haulage contractor. The average efficiency of volatile solids reduction was 52%.

East Side Plant - A total of 1,081,600 gallons of raw sewage was pumped to the digester during the year. Approximately 95% of this volume was returned to the plant treatment processes as supernatant. A total of 895 cu. yd. of digested sludge was hauled from the plant.

CONCLUSIONS and RECOMMENDATIONS

Both the East Side and West Side Plants were hydraulically overloaded during the year. However, all raw sewage flows directed to the West Side plant were treated and an acceptable effluent produced. Part of the raw sewage flows directed to the East Side plant bypassed plant treatment facilities at all times.

It is recommended that the municipality take immediate steps to engage a consulting engineer to prepare a report on methods of alleviating the hydraulic overloading at both plants, especially the East Side treatment plant.

PROJECT COSTS

2-0047-59

NET CAPITAL COST (Final) Long Term Debt to OWRC	\$625,008.36
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	\$126,164.36
Net Operating	\$ 97,206.18*
Debt Retirement	12,613.00
Reserve	2,876.40
Interest Charged	<u>34,991.00</u>
TOTAL	<u>\$147,686.58</u>

RESERVE ACCOUNT

Balance @ January 1, 1969	\$ 32,904.64
Deposited by Municipality	2,876.40
Interest Earned	<u>1,923.54</u>
	\$ 37,704.58
Less Expenditures	<u>3,982.41</u>
Balance @ December 31, 1969	<u>\$ 33,722.17</u>

* Does not include interest penalty of \$33.48

2-0073-60

NET CAPITAL COST (Final)	\$325,199.95
DEDUCT - Portion Financed by CMHC/MDLB (Final)	<u>47,154.39</u>
Long Term Debt to OWRC	<u>\$278,045.56</u>
 Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	 <u>\$ 84,877.72</u>
 Net Operating	 \$ 43.45
Debt Retirement	10,088.00
Reserve	1,604.62
Interest Charged	<u>15,566.34</u>
 TOTAL	 <u>\$ 27,302.41</u>

RESERVE ACCOUNT

Balance @ January 1, 1969	\$ 15,182.31
Deposited by Municipality	1,604.62
Interest Earned	<u>898.91</u>
	\$ 17,685.84
 Less Expenditures	 <u>-</u>
Balance @ December 31, 1969	<u>\$ 17,685.84</u>

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NET CAPITAL COST (Final)		\$291,992.10
DEDUCT - Payments from Municipality	\$87,025.24	
- Portion financed by CMHC/MDLB (Final)	<u>78,293.33</u>	<u>165,318.57</u>
Long Term Debt to OWRC		<u>\$126,673.53</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969		\$ <u>32,660.18</u>
Net Operating		58.45*
Debt Retirement		4,596.00
Reserve		1,123.62
Interest Charged		<u>7,091.81</u>
TOTAL		\$ <u>12,869.88</u>

RESERVE ACCOUNT

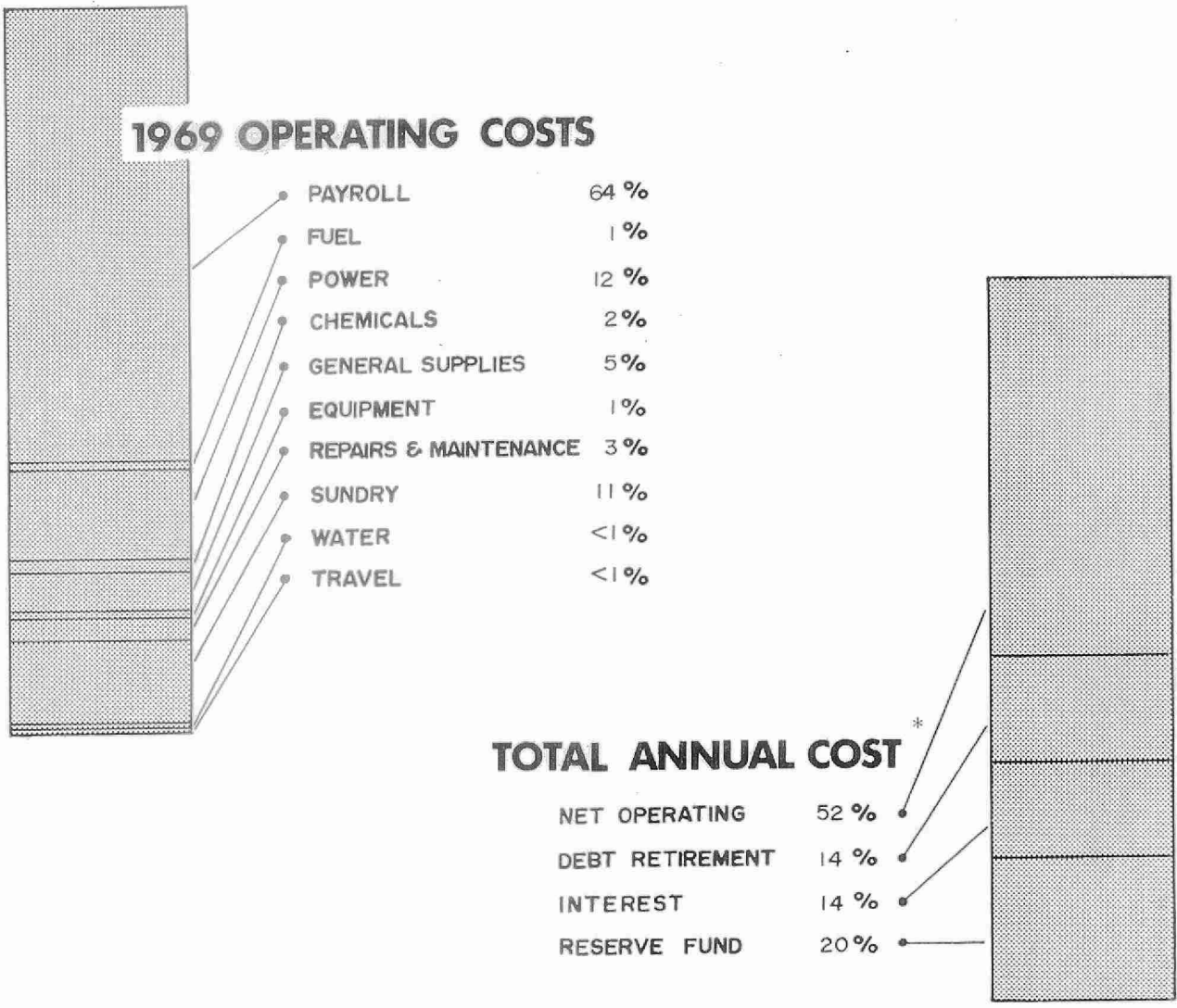
Balance @ January 1, 1969	\$ 7,920.59
Deposited by Municipality	1,123.62
Interest Earned	<u>475.37</u>
	\$ 9,519.58
Less Expenditures	<u>-</u>
Balance @ December 31, 1969	\$ <u>9,519.58</u>

* Not including interest penalty of \$8.68

2 - 0047 - 59 (Special Operating Agreement)

RESERVE ACCOUNT

Balance @ January 1, 1969	\$ 5,215.21
Deposited by Municipality	5,100.00
Interest Farned	<u>413.63</u>
	\$10,728.84
Less Expenditures	<u>-</u>
Balance @ December 31, 1969	<u><u>\$10,728.84</u></u>



Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1965	731.51	\$64,498.43	\$ 88.17	11 cents
1966	682.86	65,868.62	96.46	13 cents
1967	802.96	72,358.82	88.87	11 cents
1968	926.85	78,488.49	84.68	12 cents
1969	963.6	97,206.18	100.88	12 cents

* All projects

Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	6758.38	6465.80	-	143.00	-	-	149.58	-	-	-	-	-
FEB	6823.82	4409.50	-	159.29	1198.17	-	285.27	2.85	433.47	335.27	-	-
MAR	6413.28	4377.23	-	125.27	1261.73	-	223.81	49.90	-	375.34	-	-
APR	7590.71	4552.37	-	177.26	943.91	227.25	545.22	477.13	62.62	604.95	-	-
MAY	7327.09	4994.27	219.62	104.43	961.09	-	185.12	-	346.37	474.69	41.50	-
JUNE	6930.86	4748.42	208.13	63.58	945.12	-	381.67	-	19.79	559.15	-	5.00
JULY	7468.38	4932.27	292.42	85.68	967.70	238.61	491.21	17.92	29.40	287.36	-	125.70
AUG	9561.08	7412.61	272.14	20.72	774.08	-	378.87	83.30	100.00	457.45	66.91	(5.00)
SEPT	7447.44	4898.35	106.12	61.38	1034.62	11.36	602.03	29.29	314.81	389.48	-	-
OCT	7169.17	4926.66	-	47.78	5778.17	527.02	308.83	104.10	92.54	384.07	-	-
NOV	8137.90	5769.97	-	78.79	965.27	482.14	431.89	-	189.89	110.54	109.41	-
DEC	15578.07	4167.85	-	202.89	2300.63	264.91	926.52	-	1348.36	6254.76	-	112.15
TOTAL	97206.18	61655.30	1098.43	1270.07	12130.49	1751.29	4910.13	764.49	2937.25	10233.06	217.82	237.85

BRACKETS INDICATE CREDIT

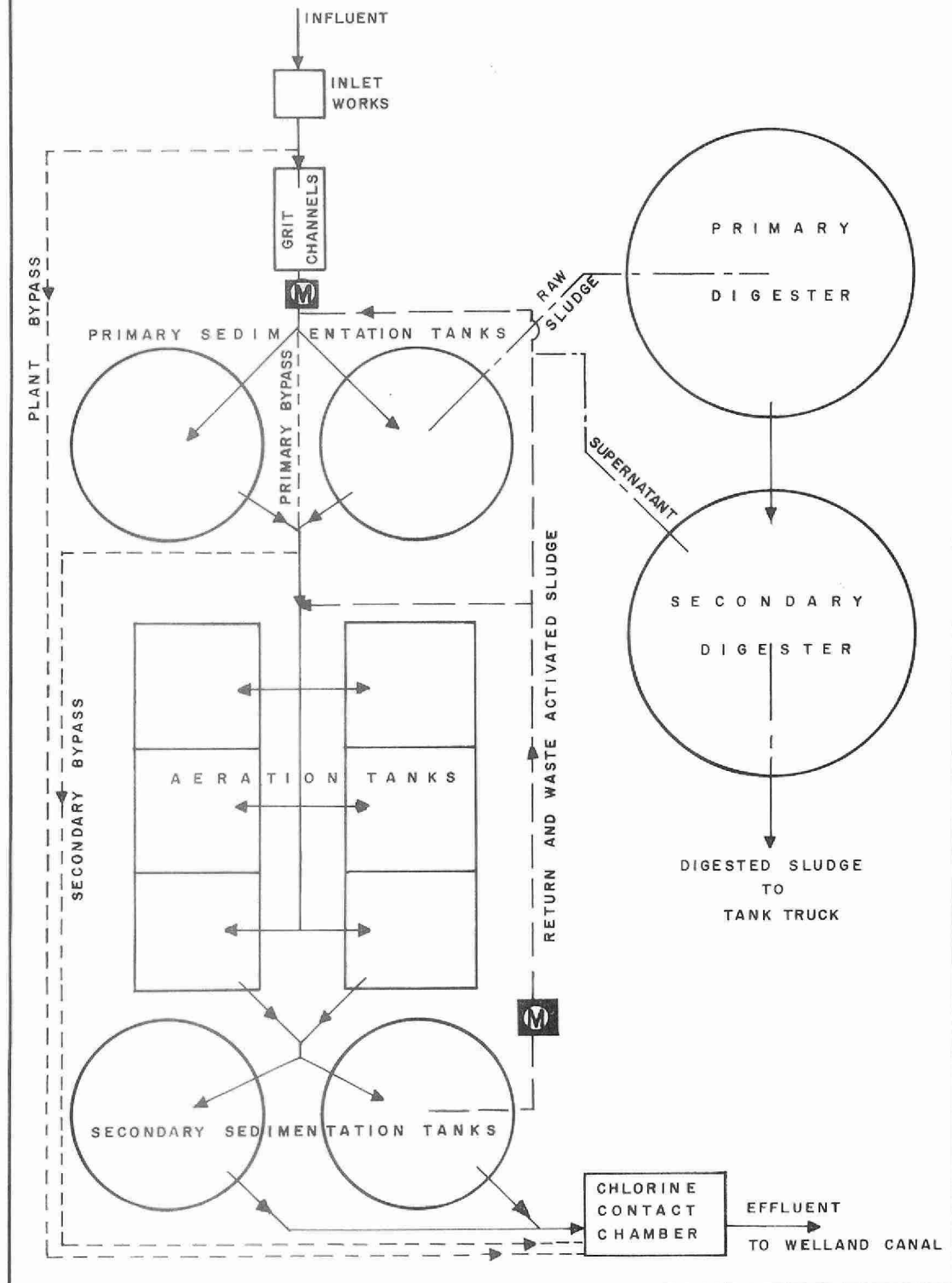
* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE \$8429.27

WEST SIDE PLANT



PROCESS DATA

PORT COLBORNE WEST SIDE WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NO.	2-0047-59	TREATMENT	Activated Sludge
DESIGN FLOW	0.90 mgd	DESIGN POPULATION	9,000
BOD - Raw Sewage	225 mg/l	SS - Raw Sewage	300 mg/l
- Removal	93%	- Removal	93%

PRIMARY TREATMENT

Screening

Type: Manually cleaned
Size: Two, 1" spacing

Grit Removal

Type: Channels
Size: Two 40' 4" x 1' 10" (838 gal)
Retention: 0.67 min (one channel)
Velocity: 1 fps

Primary Sedimentation

Type: Dorr
Size: Two 50' dia x 9' swd
(220,000 gal)
Retention: 5.9 hr
Loading: Surface, 229 gal/ft²/day
Weir, 2,860 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical
Size: Six 30' x 30' x 10½' cells
(326,000 gal)
Retention: 8.8 hr

Aerators

- Six Ames Crosta Mills

Secondary Sedimentation

Type: Ames Crosta
Size: Two 45' dia x 8' (159,500 gal)
Retention: 4.24 hr
Loading: Surface, 282 gal/ft²/day
Weir, 3,200 gal/ft/day

CHLORINATION

Type: W & T
Size: Two 400 lb/day

Chlorine Contact Chamber

Size: 100,000 gal
Retention: 16 min

OUTFALL

- to Welland Canal

SLUDGE HANDLING

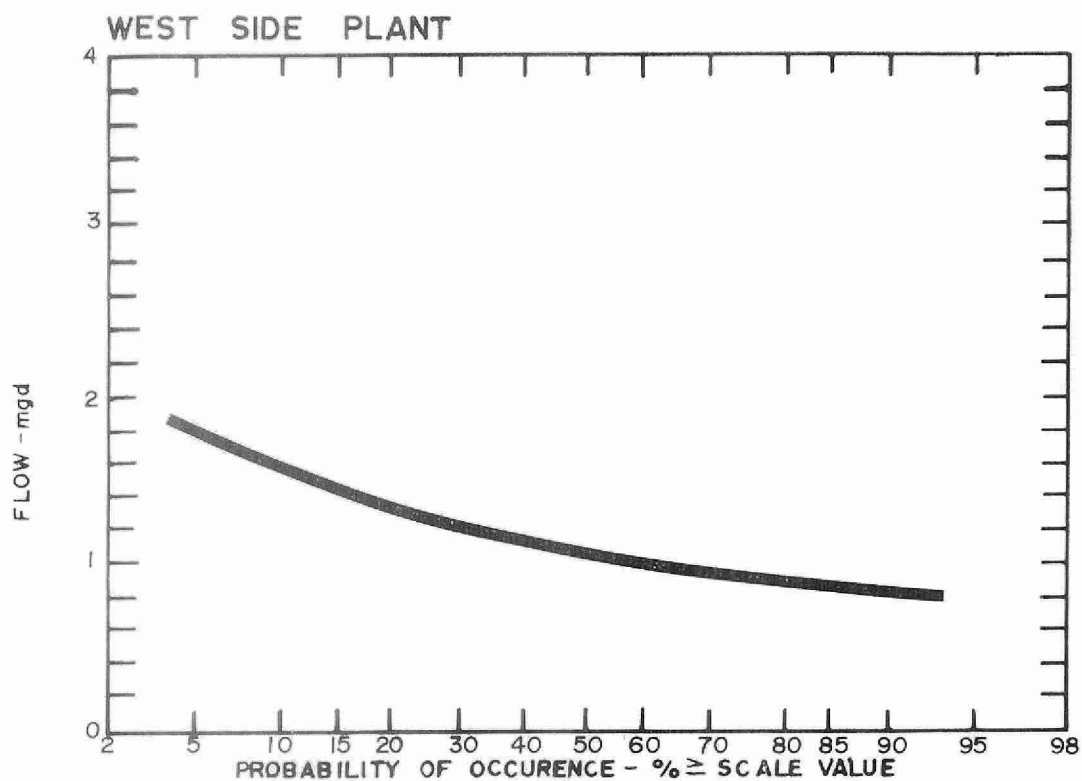
Digestion System - Two-stage

Primary --

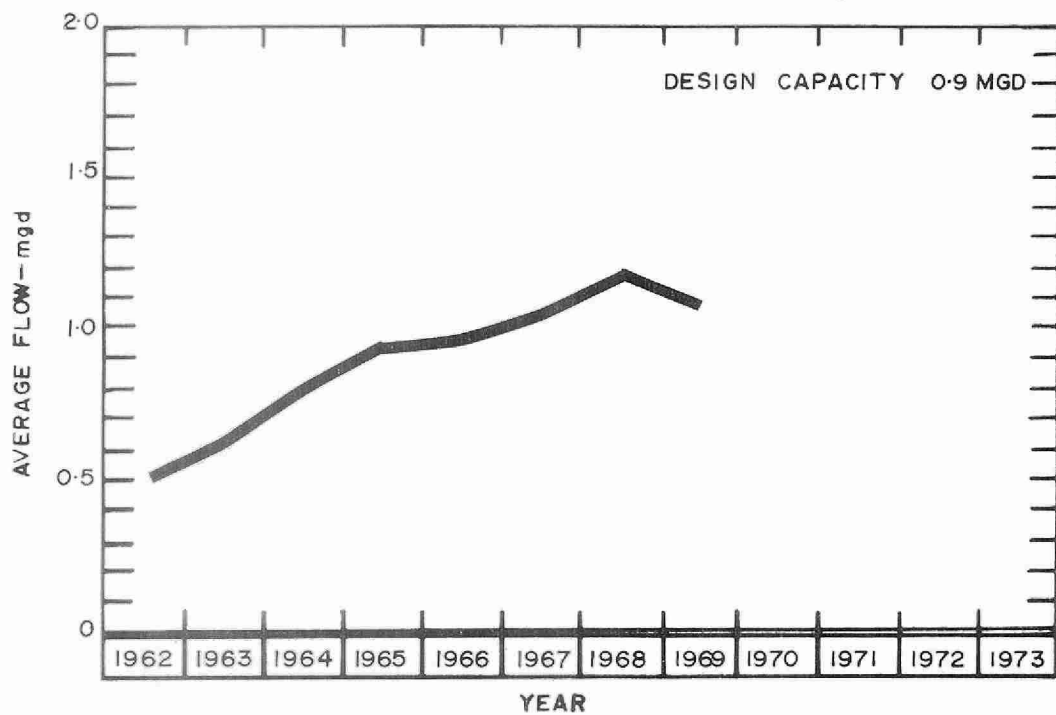
Type: Dorr, 1 draft tube mixer
Size: One 35' dia x 22' swd (21,200 cu ft or 0.132 mil gal)
Loading: 3.56 lb/cu ft/mo

Secondary --

Size: One 30' dia x 19' swd (13,400 cu ft or 83,500 gal)
Total Loading: 218 lb/cu ft/mo

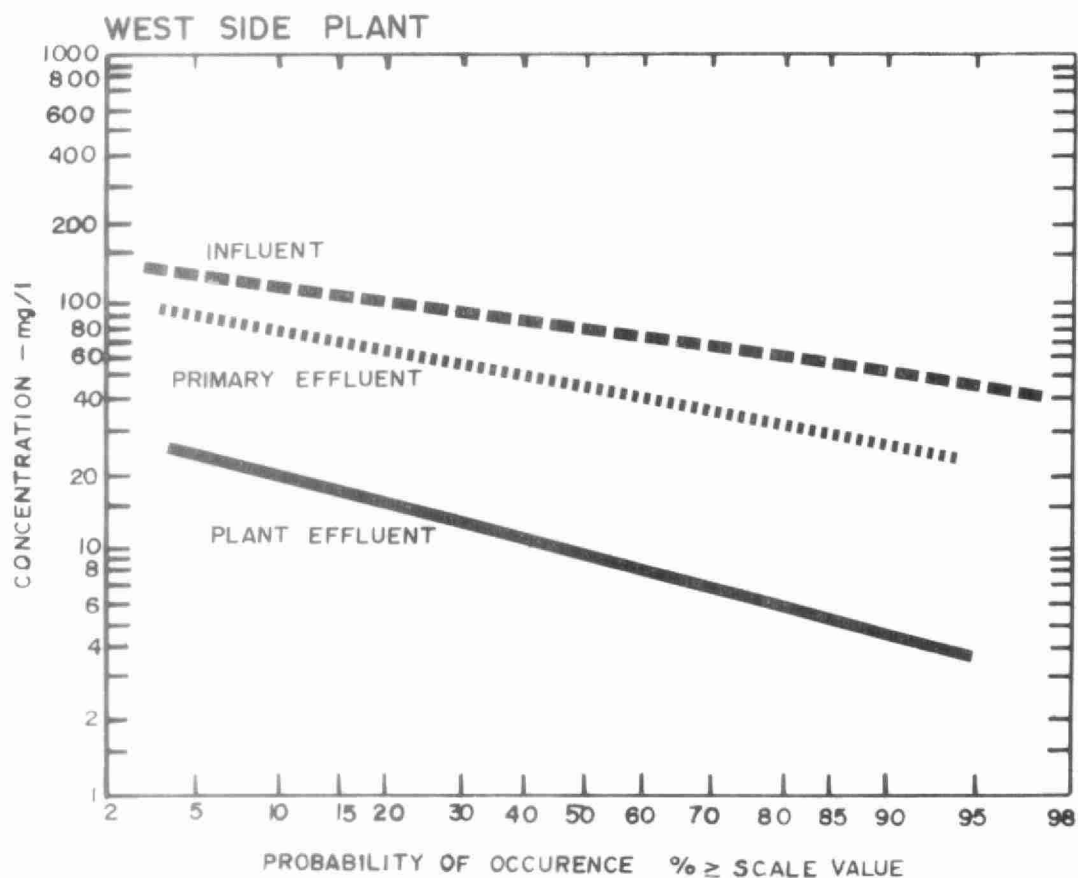


FL O W S

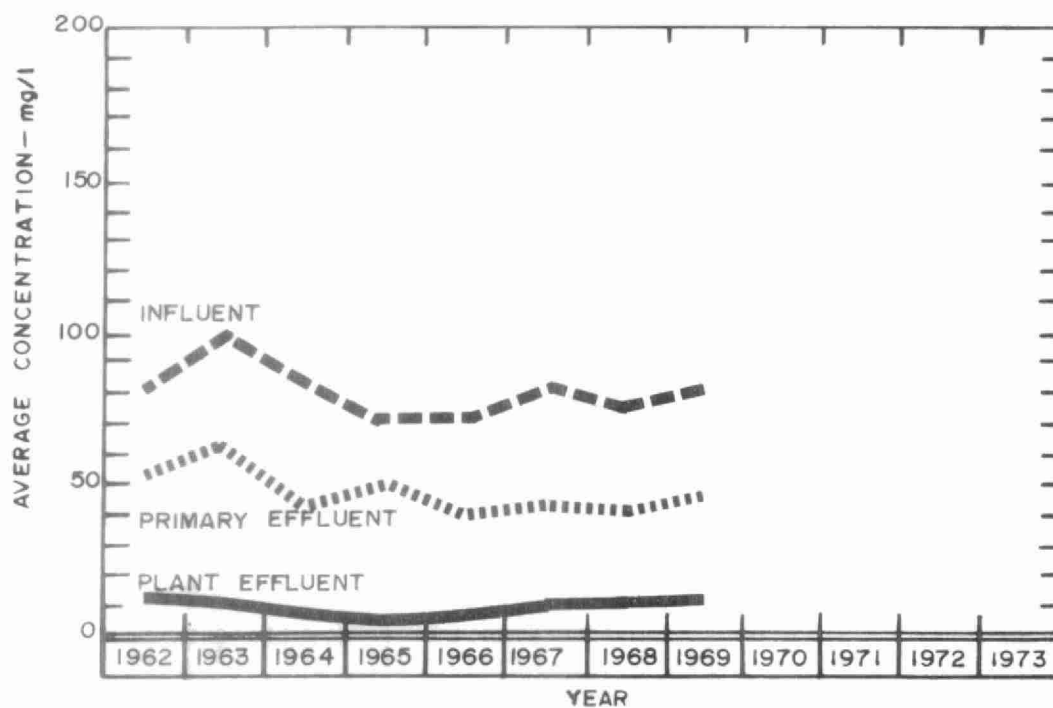


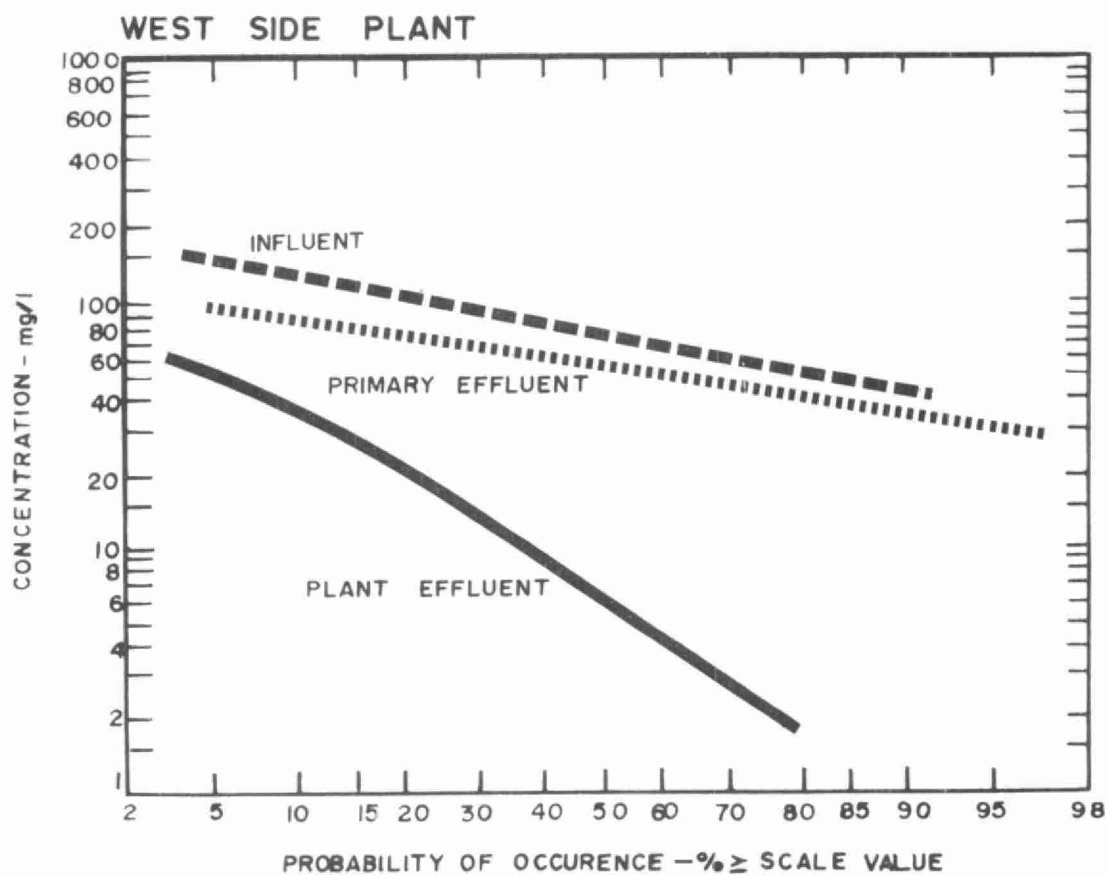
PLANT FLOWS and CHLORINATION

MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED pounds	DOSAGE mg/l
JAN	41.3	1.3	2.2	.9	962	2.3
FEB	31.4	1.1	2.0	.8	618	2.0
MAR	31.9	1.0	1.8	.7	770	2.4
APR	44.8	1.5	2.2	1.1	782	1.7
MAY	40.7	1.3	2.5	.9	796	2.0
JUNE	34.0	1.1	1.7	.9	792	2.3
JULY	38.9	1.3	2.5	1.0	1008	2.6
AUG	34.7	1.1	1.8	.9	1064	3.1
SEPT	26.6	.8	1.3	.8	1087	4.1
OCT	28.1	.9	1.4	.8	1008	3.6
NOV	43.2	1.3	2.1	.9	1262	4.3
DEC	41.1	1.3	2.5	.9	1133	2.8
TOTAL	436.7	-	-	-	11282	-
AVERAGE	-	1.1	-	-	940	2.7

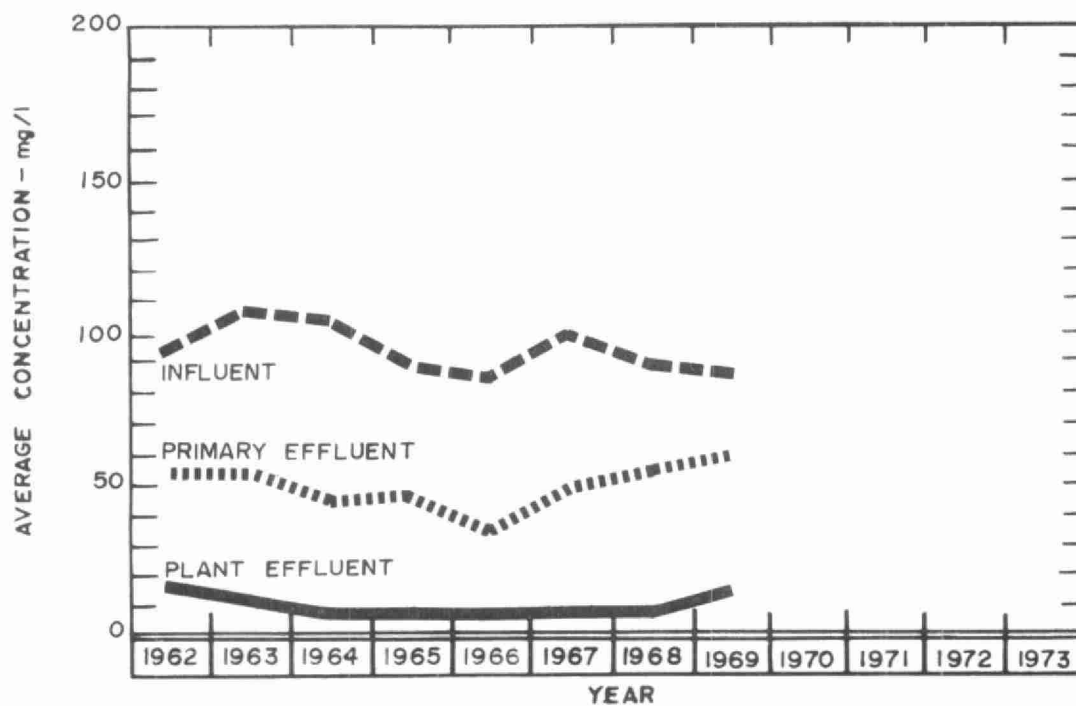


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS

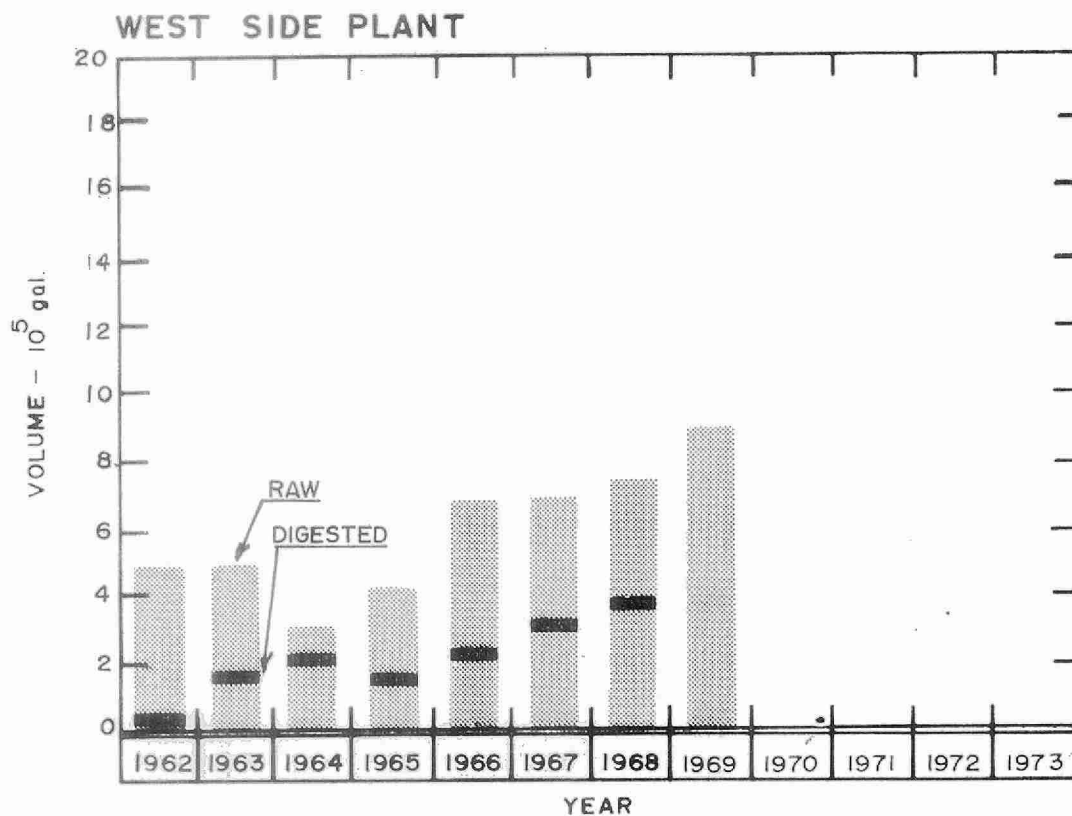


PLANT EFFICIENCY

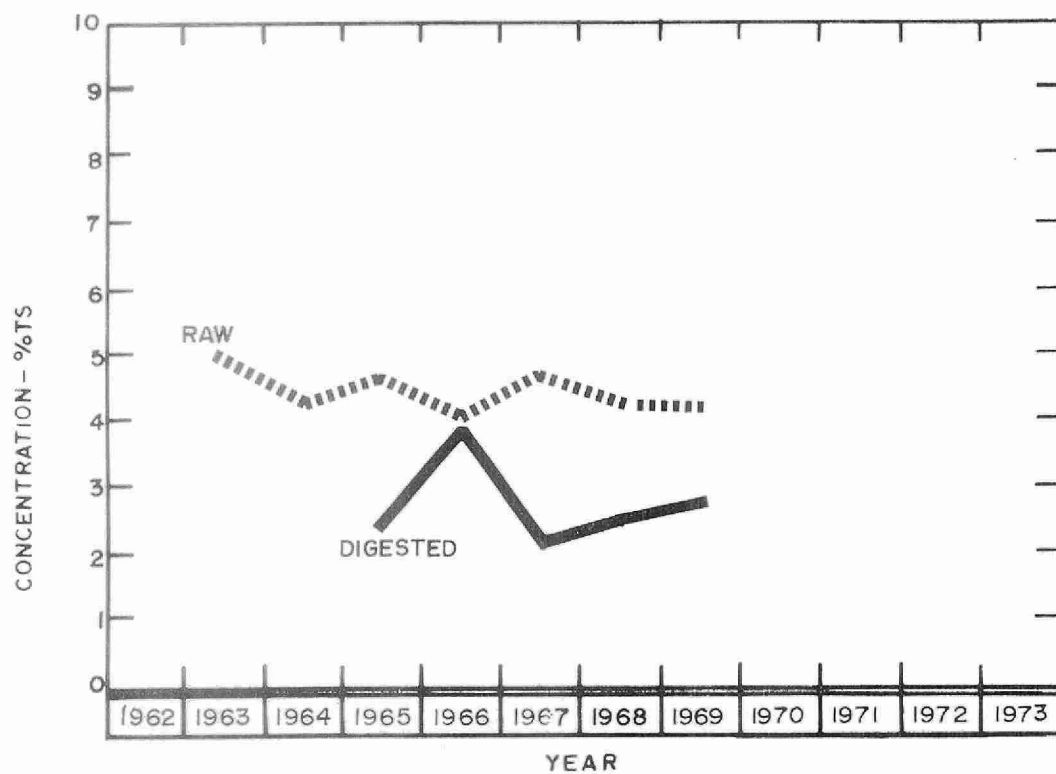
MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT REMOVAL
	INF. mg/l	EFF. mg/l	REDUCTION		INF. CONCN mg/l	EFF. CONCN mg/l	REDUCTION		
			%	10 ³ pounds			%	10 ³ pounds	cu
JAN	70	17	76	21.9	70	10	86	24.8	36
FEB	73	9	88	20.1	125	8	94	36.7	22
MAR	102	12	88	28.7	90	13	86	34.5	0
APR	70	3	96	30.0	50	10	80	17.9	26
MAY	67	5	92	25.2	75	27	64	19.5	0
JUNE	60	15	75	15.3	85	5	94	27.2	0
JULY	85	8	91	30.0	110	5	95	40.8	0
AUG	81	5	84	26.4	92	5	94	30.2	32
SEPT	108	10	91	26.1	123	12	90	29.5	28
OCT	140	16	88	34.8	70	25	85	40.7	16
NOV	63	14	77	21.2	81	25	69	24.2	26
DEC	59	40	32	22.6	67	45	32	25.7	14
TOTAL	-	-	-	-	-	-	-	3517	200
AVERAGE	81	12	85	25.1	86	16	81	29.3	25

AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		MLSS CONCN mg/l	F/M <div>lb BOD lb MLSS</div>
		BOD	SS	BOD	SS		
		mg/l	mg/l	mg/l	mg/l		
JAN	1.3	57	55	17	10	2230	.31
FEB	1.1	43	60	9	8	1600	.28
MAR	1.0	59	53	12	13	1260	.43
APR	1.5	24	40	3	10	1300	.24
MAY	1.3	35	45	5	27	1230	.33
JUNE	1.1	29	53	15	5	2300	.12
JULY	1.3	48	70	8	5	1630	.33
AUG	1.1	42	67	5	5	1560	.27
SEPT	.8	56	83	10	12	1730	.24
OCT	.9	100	100	16	25	1030	.78
NOV	1.3	50	61	14	25	1550	.38
DEC	1.3	35	37	40	45	760	.38
TOTAL	-	-	-	-	-	-	-
AVERAGE	1.1	48	60	12	16	1515	.34



DIGESTION



SLUDGE DIGESTION and DISPOSAL

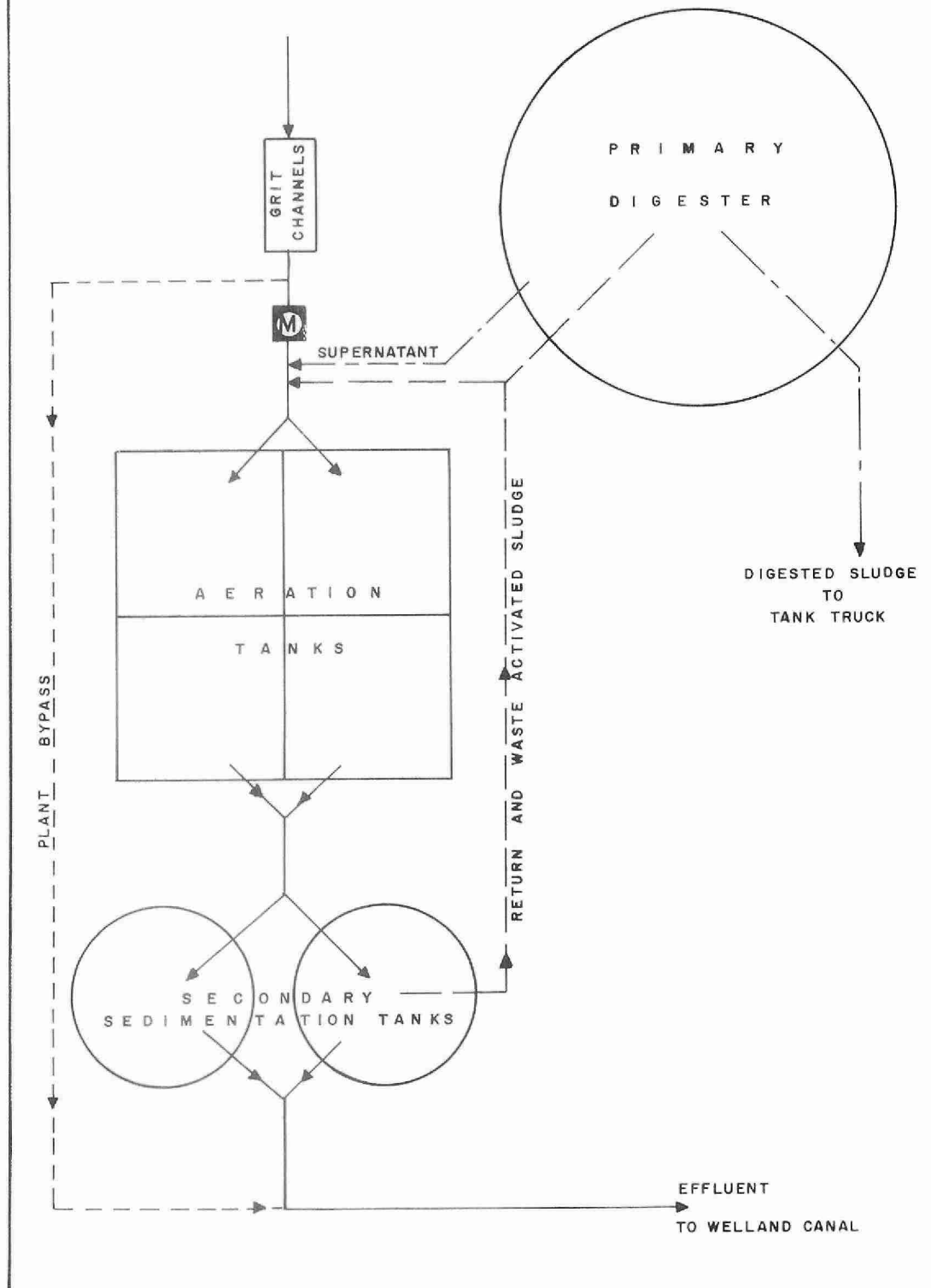
MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME	TOTAL SOLIDS	VOL SOLIDS	VOLUME	TOTAL SOLIDS	VOL SOLIDS	VOLUME	TOTAL SOLIDS	DEWATERED	LIQUID
	10 ³ gal	%	%	10 ³ gal	%	%	10 ³ gal	%	cu yd	cu yd
JAN	69.9	3.0	76	21.2	-	-	36.7	.8	0	126
FEB	65.6	4.1	73	30.0	-	-	35.2	1.0	0	177
MAR	101.0	3.2	77	70.0	-	-	30.9	1.3	0	414
APR	71.9	3.5	75	41.0	-	-	32.9	.6	0	225
MAY	85.2	4.0	74	49.7	-	-	35.4	.6	80	294
JUNE	84.4	4.1	84	43.8	2.5	-	33.8	1.4	0	264
JULY	83.9	3.7	76	40.4	3.2	-	28.8	1.7	0	239
AUG	77.9	4.2	69	44.7	3.1	-	25.8	2.3	0	265
SEPT	87.7	4.8	78	29.8	3.2	61	48.6	1.3	0	176
OCT	84.4	4.1	84	43.8	2.5	65	33.8	1.4	0	264
NOV	59.0	6.0	81	14.9	3.4	62	20.9	-	0	202
DEC	39.0	6.0	81	10.6	-	-	19.9	4.9	0	63
TOTAL	909.9	-	-	439.9	-	-	382.7	-	80	2709
AVERAGE	75.8	4.2	77	33.6	2.9	63	31.8	15	0	225

EAST SIDE PLANT



PROCESS DATA

PORT COLBORNE EAST SIDE
WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NO.

2-0047-59

TREATMENT Activated Sludge

DESIGN FLOW 0.85 mgd

PRIMARY TREATMENT

Screening

- Two at head of grit channels

Grit Removal

Type: Channels, manually cleaned
Size: Two 15' long

Comminution

- One Jones-Atwood

Primary Sedimentation

- Not provided

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical
Size: Four 30' x 30' x 16' (276,000 gal)
Retention: 7.8 hr

Aerators

- Four Ames Crosta

Secondary Sedimentation

Type: Ames Crosta
Size: Two 30' dia x 8' swd (70,400 gal)
Retention: 2.0 hr
Loading: Surface, 600 gal/ft²/day
Weir, 4,520 gal/ft/day

CHLORINATION

- not provided

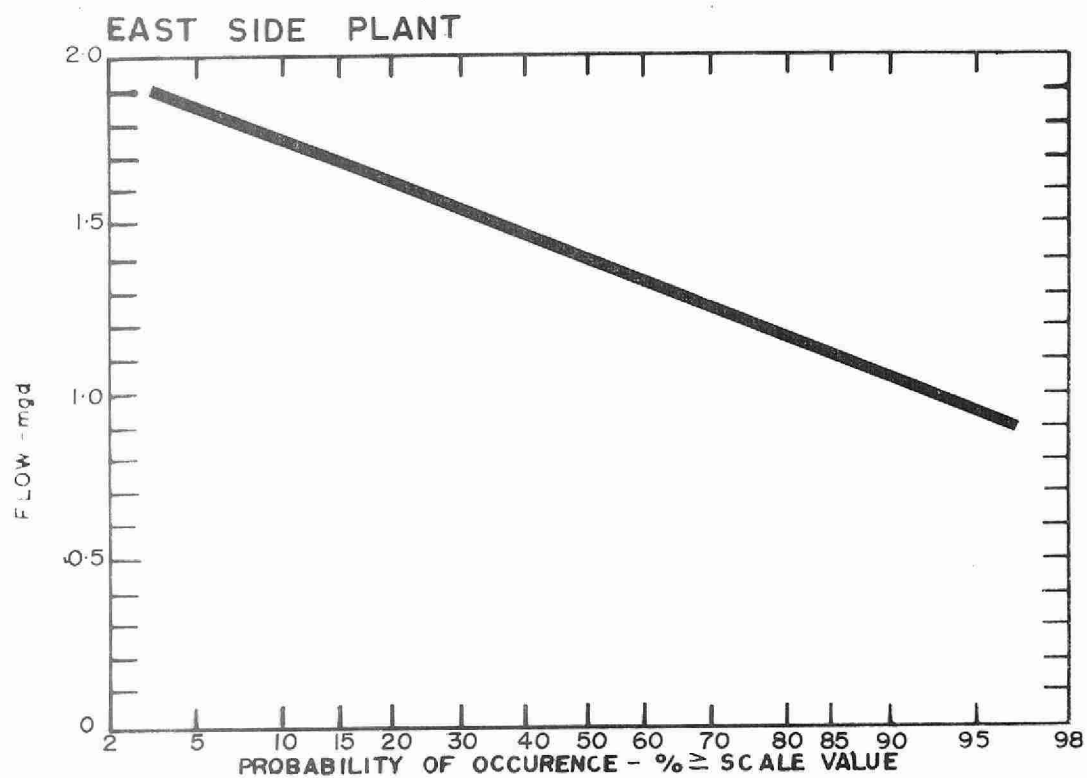
OUTFALL

- to Welland Canal

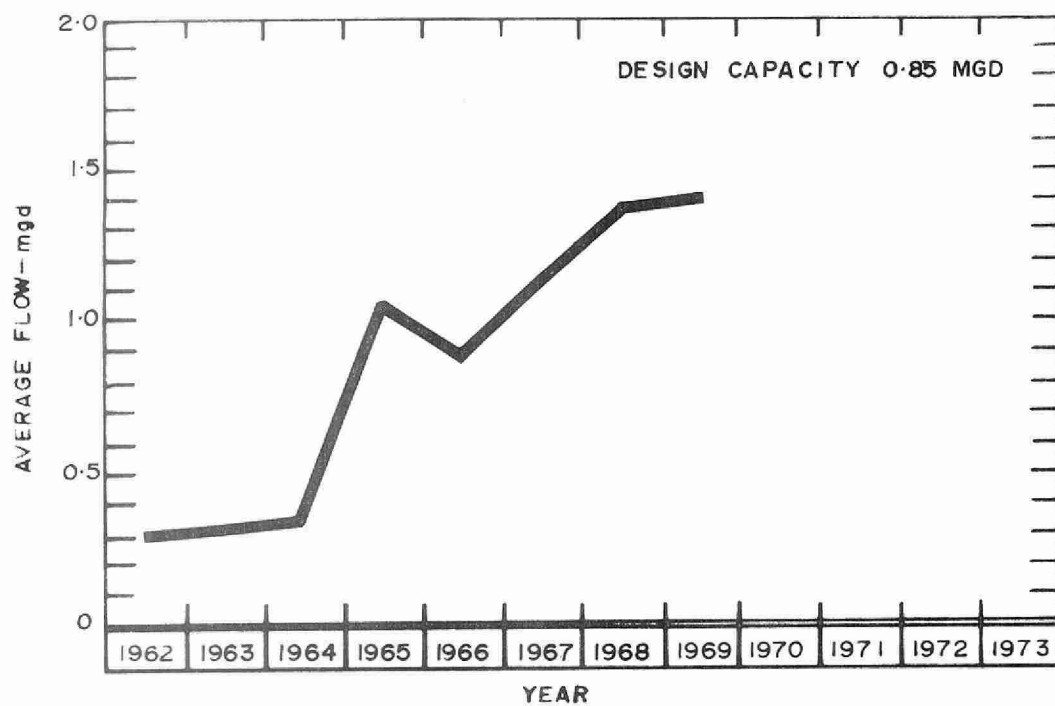
SLUDGE HANDLING

Digestion System - Single-stage

Type: PFT mixed by recirculation
Size: One 50' dia x 23' swd (44,800 cu ft
or 0.28 mil gal)

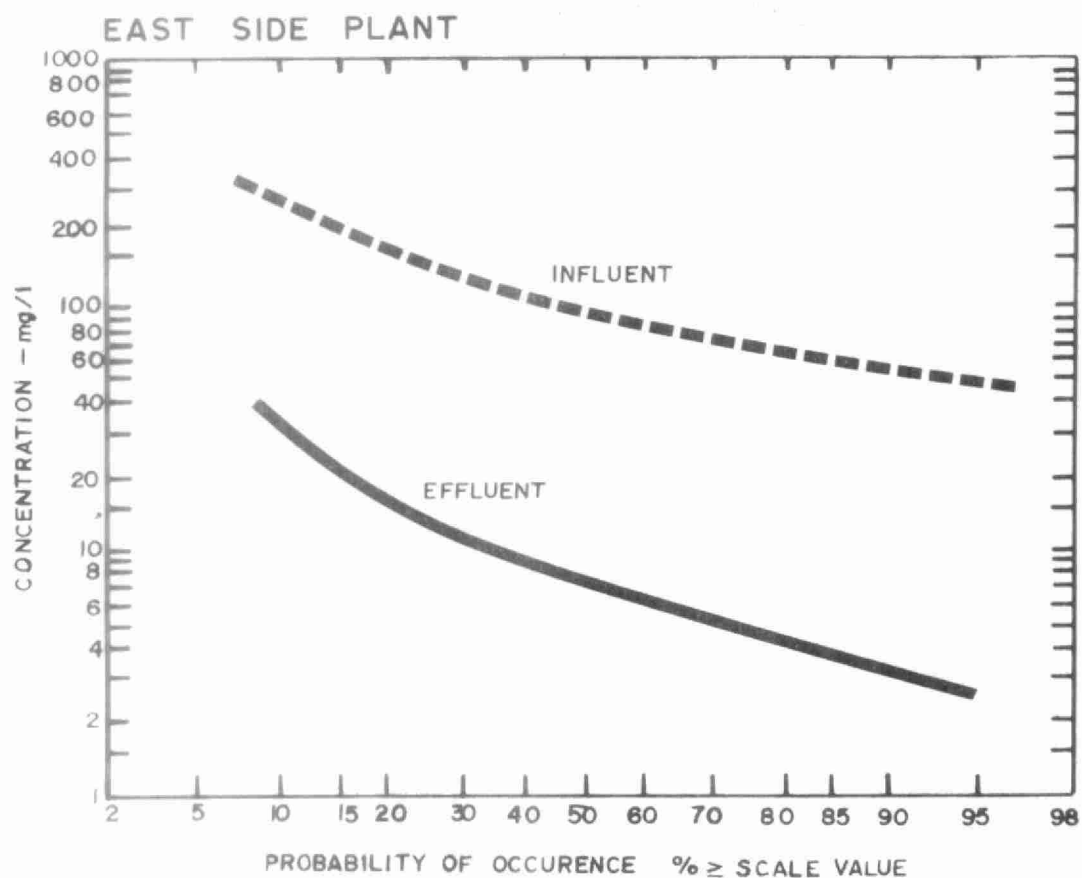


FL O W S

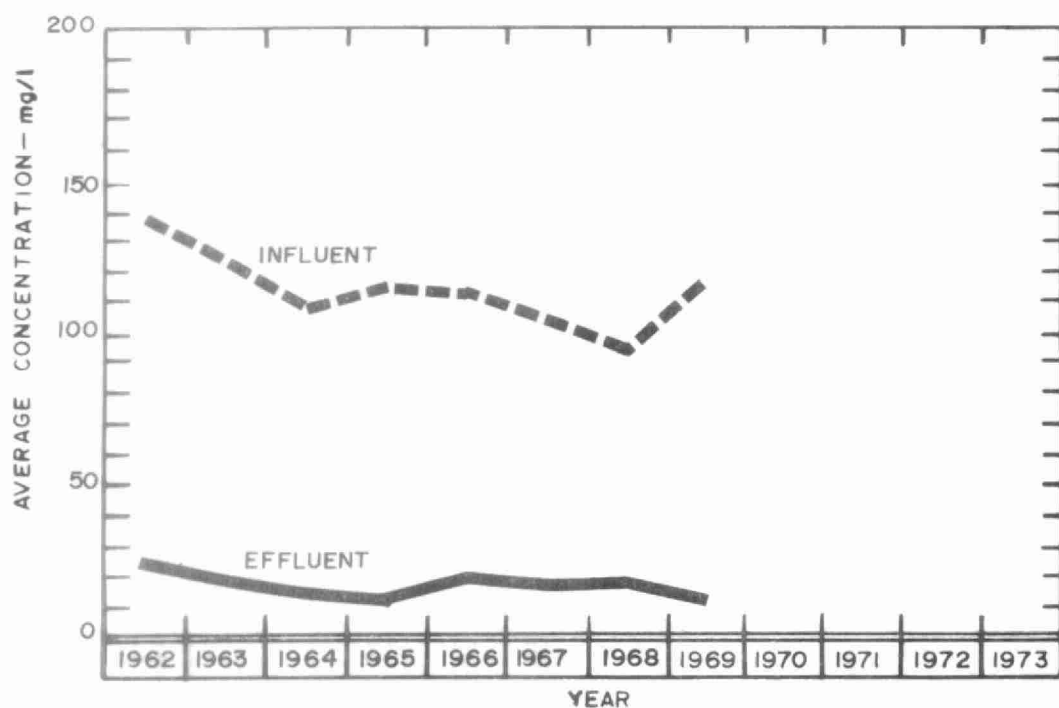


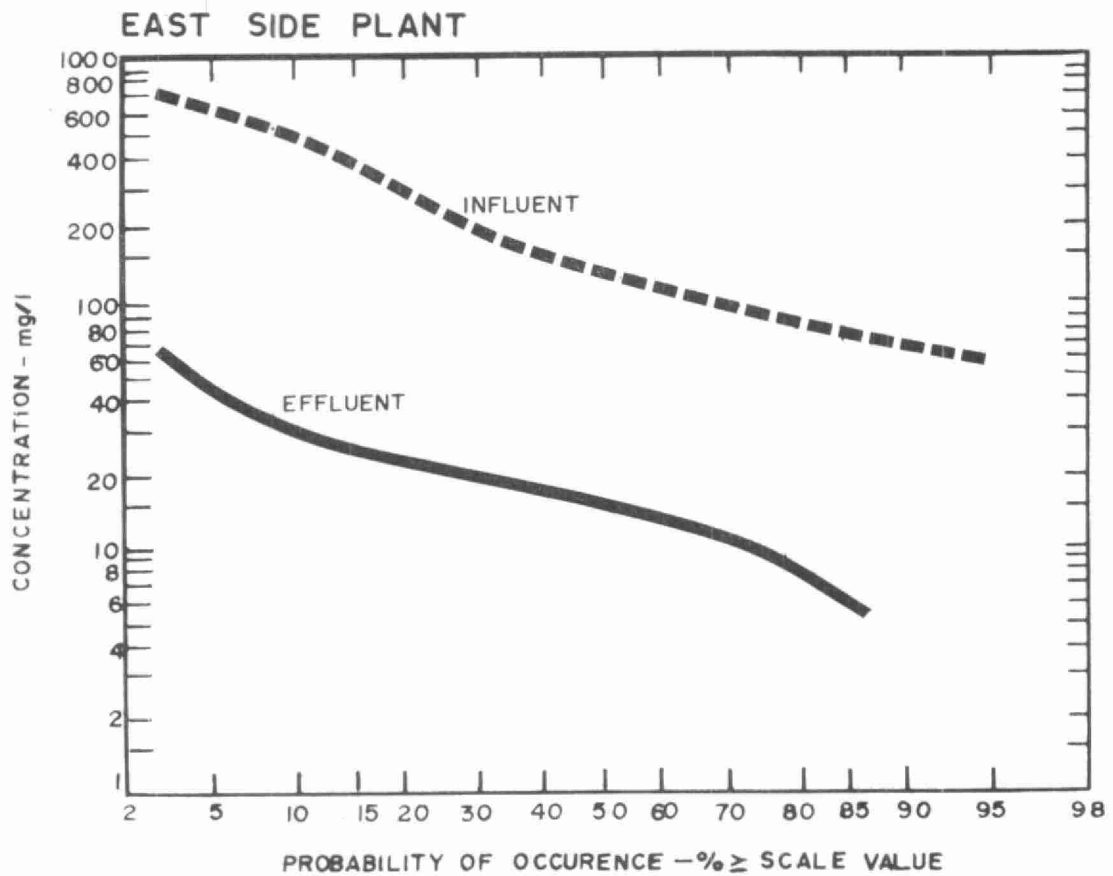
PLANT FLOWS

MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal
JAN	46.9	1.5	1.8	1.2
FEB	36.8	1.3	1.7	1.1
MAR	39.9	1.3	1.7	1.0
APR	47.2	1.6	2.0	1.2
MAY	44.2	1.4	1.9	1.1
JUNE	37.1	1.2	1.8	1.0
JULY	42.2	1.4	1.9	.9
AUG	45.0	1.5	1.9	1.3
SEPT	42.8	1.4	1.8	1.3
OCT	41.0	1.4	1.7	1.1
NOV	50.8	1.6	2.0	1.2
DEC	53.0	1.7	2.2	1.2
TOTAL	526.9	-	-	-
AVERAGE	-	1.4	-	-

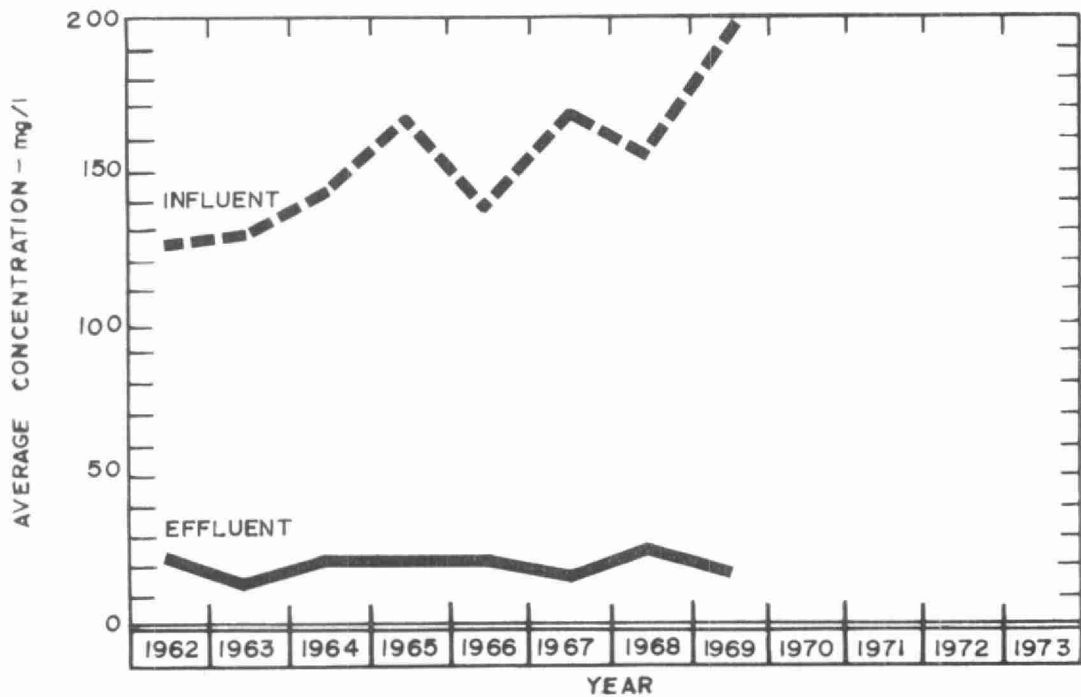


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS

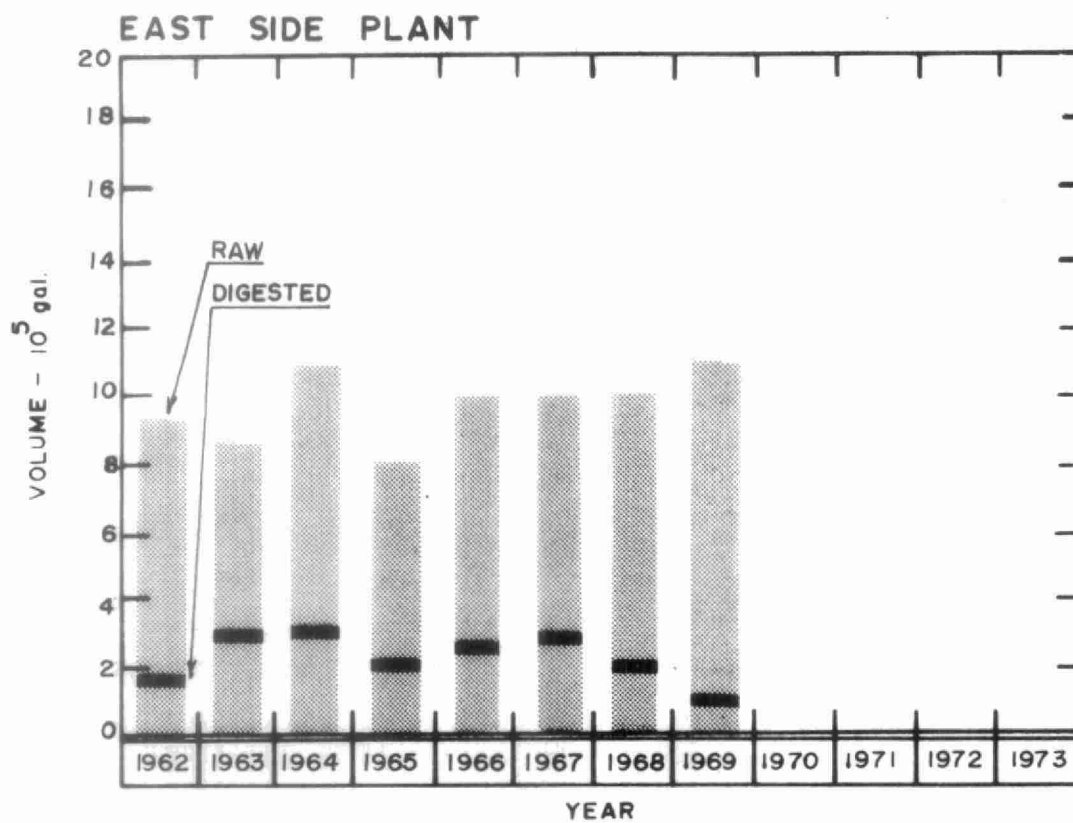


PLANT EFFICIENCY

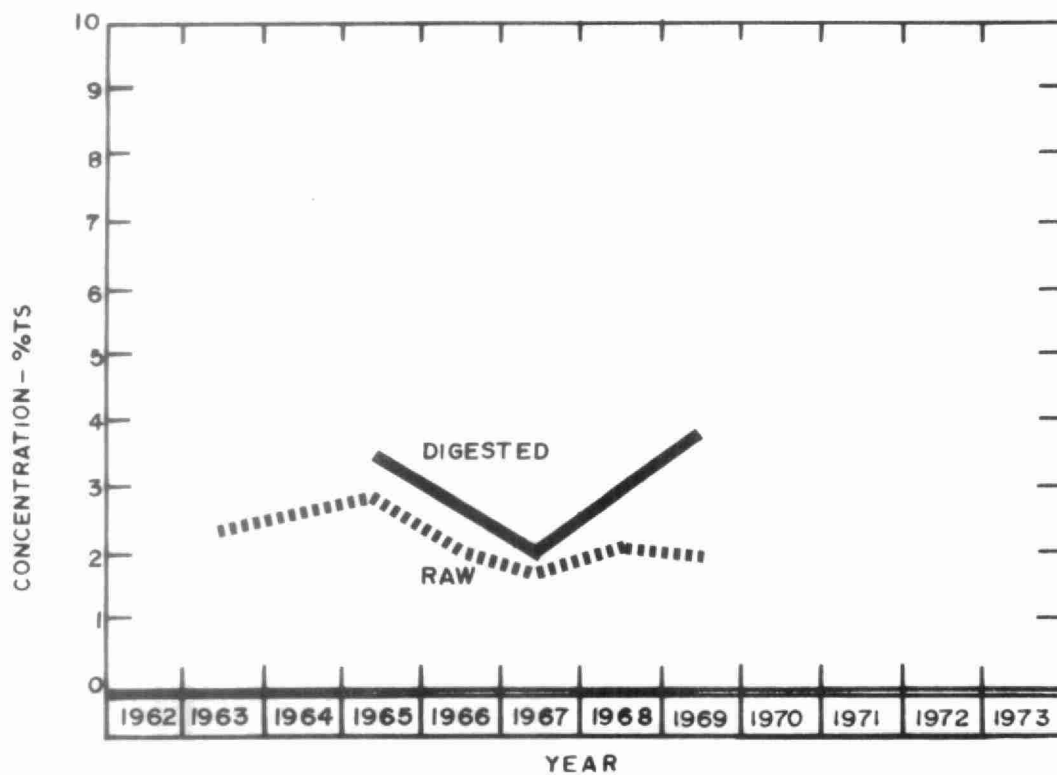
MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT REMOVAL
	INF. mg/l	EFF. mg/l	REDUCTION		INF. CONCN mg/l	EFF. CONCN mg/l	REDUCTION		
			%	10 ³ pounds			%	10 ³ pounds	cu
JAN	167	9	95	74.1	220	20	91	93.8	24
FEB	65	12	81	19.5	110	20	82	33.1	40
MAR	150	19	87	52.3	290	25	91	105.7	0
APR	190	12	94	84.0	390	40	90	165.2	32
MAY	75	30	60	19.9	100	28	72	31.8	28
JUNE	130	12	91	43.8	185	20	89	61.2	0
JULY	148	6	96	59.9	295	10	97	120.3	16
AUG	67	4	94	28.4	125	7	94	53.1	52
SEPT	77	6	92	30.4	100	10	90	38.5	98
OCT	152	8	94	59.0	313	30	90	116.0	52
NOV	90	6	93	42.7	114	11	90	52.3	88
DEC	66	7	89	31.2	120	14	88	56.2	40
TOTAL	-	-	-	-	-	-	-	927.2	470
AVERAGE	114	11	90	45.4	197	19	90	77.2	43

AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		MLSS CONCN mg /l	F/M lb BOD lb MLSS	AIR USED 1000 cu ft lb BOD	WASTE SLUDGE 10 ⁶ pounds
		BOD mg/l	SS CONCN mg/l	BOD mg/l	SS CONCN mg/l				
JAN	1.5	167	220	9	20	2620	.70	-	.576
FEB	1.3	65	110	12	20	2680	.23	-	-
MAR	1.3	150	290	19	25	1860	.49	-	-
APR	1.6	190	390	12	40	2710	.81	-	-
MAY	1.4	75	100	30	28	2800	.27	-	-
JUNE	1.2	130	185	12	20	2280	.36	-	-
JULY	1.4	148	295	6	10	2330	.32	-	-
AUG	1.5	67	125	4	7	2790	.13	-	-
SEPT	1.4	77	100	6	10	3050	.13	-	-
OCT	1.4	152	313	8	30	2880	.27	-	-
NOV	1.6	90	114	6	11	2570	.20	-	-
DEC	1.7	66	120	7	14	2510	.16	-	-
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	1.4	114	197	11	19	2490	.33	-	.576



DIGESTION



SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE HOLDING TANK			SUPERNATANT		SLUDGE DISPOSAL LIQUID	
	VOLUME	TOTAL SOLIDS	VOL SOLIDS	VOLUME	TOTAL SOLIDS	VOL SOLIDS	VOLUME	TOTAL SOLIDS	HOLDING TANK	RAW
	10 ³ gal	%	%	10 ³ gal	%	%	10 ³ gal	%	cu yd	cu yd
JAN	93.5	1.5	77	17.0	-	-	96.5	-	101	0
FEB	84.0	1.7	79	0	-	-	73.0	-	0	47
MAR	101.5	2.3	67	0	-	-	102.0	-	0	178
APR	90.0	2.6	73	0	-	-	90.5	-	0	107
MAY	93.0	1.5	76	21.2	-	-	69.0	-	126	0
JUNE	88.0	2.0	76	0	-	-	61.5	-	0	0
JULY	82.0	2.4	71	21.2	-	-	102.0	-	126	0
AUG	87.0	2.5	68	0	-	-	75.0	-	0	0
SEPT	90.0	3.1	72	34.0	3.9	58	87.3	1.4	202	0
OCT	93.0	1.8	70	14.9	-	-	92.0	-	88	0
NOV	90.6	2.0	73	21.2	-	-	81.0	-	126	0
DEC	94.0	1.6	66	21.2	-	-	100.5	3.0	126	0
TOTAL	1086.6	-	-	150.7	-	-	1030.0	-	895	332
AVERAGE	90.5	2.0	72	12.6	3.9	58	85.8	2.6	75	-



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Date Due

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Water management in Ontario